

SANDRA LITTLE COVINGTON, *et al.*,

Plaintiffs,

v.

STATE OF NORTH CAROLINA, *et al.*

Defendants.

2. I graduated with a Bachelor of Arts in Government with Honors from Claremont McKenna College in 1992. I graduated with a Master's degree in Business Administration from the Anderson School at UCLA in 1999, and in 2015 I graduated with a Ph.D. in Political Science from Claremont Graduate University. Since 2001, I have served as a Fellow at the Rose Institute of State and Local Government at Claremont McKenna College. As Student Manager of the Rose Institute in 1991 and as a Fellow at the Rose Institute in 2001 and 2011, I have led political, demographic

and process research on state and local redistricting through three post-decennial census redistricting cycles. In that capacity I have issued numerous white papers, op-ed pieces, in-depth analyses and other reports on the Census, demographics, districting and redistricting, including primary oversight of the Rose Institute's "Redistricting in America" report and website, which remains widely quoted in state and national news coverage of this issue. These opinion pieces were printed by publications including the New York Times and the Los Angeles Times; I have been quoted in over one hundred national and local news articles; and I have appeared on redistricting-related news pieces on CNN, Fox News, and a number of public and commercial television and radio news broadcasts.

3. I am, and at all times since 2006 have been, the owner and primary consultant for National Demographics Corporation (NDC). Prior to that, I was a Senior Analyst and later Vice President for NDC from 2001 until 2006. In these roles, I have acted as demographic and technical consultant on matters related to analysis of demographics, polarized voting, and potential Voting Rights liability for over 300 California jurisdictions, along with numerous jurisdictions in other states. I have worked on the districting or redistricting of 195 state and local jurisdictions, including tiny Clay Elementary School District (in California); the city of San Diego; the counties of San Diego and Los Angeles; and Arizona's 2001 Independent Redistricting Commission.
4. In each of those more than 300 districting, redistricting, and liability studies, I have personally built, or supervised the building of, one or more databases combining demographic and election data from sources including the California Statewide Database, the 2000 and/or 2010 decennial Census, the Census Bureau's American Community Survey, and the Census Bureau's Special Tabulation of Citizen Voting Age Population Data, often along with local and/or county election records.
5. Also in connection with those redistricting processes, I have participated in the public process of soliciting and receiving public testimony through workshops and public hearings regarding what constitutes communities of interest within a given

jurisdiction at the time district boundaries are being developed.

6. I have been a repeat speaker at redistricting discussions and seminars organized by the National Conference of State Legislatures, and some of the presentations I delivered have included "Communities of Interest in Redistricting: A Practical Guide" (Spring 2008); "Communities of Interest in Redistricting: A key to drawing 2011 plans (and for their defense)" (Spring 2010); and "Citizen Voting Age Data from a line-drawer's viewpoint" (Winter 2011).
7. I have testified on demographic matters as an expert witness for the City of Palmdale in *Jauregui, et al. v. City of Palmdale*; as an expert witness for the City of Highland in *Garrett v. City of Highland*; as an expert witness for Kern County (CA) in *Luna v. County of Kern*; and as 30(b)(6) "Most Knowledgeable" witness for the Arizona Independent Redistricting Commission in *Arizona Minority Coalition v. Arizona Independent Redistricting Commission*, including seven days of direct testimony and cross-examination in the state court case. I also testified in the related federal court case regarding Arizona's 2001 redistricting.
8. I was deposed as an expert witness in *Soliz v. Santa Clarita Community College District* (which settled) and *Harris v. Arizona Independent Redistricting Commission*. The other cases where I have submitted a declaration or participated as a consultant are listed in my curriculum vitae.

B. Task Description

9. In this case have been asked to review the Special Master's work, report and Recommended Plans. I was asked to evaluate the Special Master's decisions and the resulting maps based on the Court's direction to the Special Master and based on traditional redistricting principles especially as those traditional principles have been applied by the Arizona Independent Redistricting Commission and the other independent or non-partisan districting and redistricting projects I have guided as technical and demographic consultant.

C. Impact of Time Limits

10. Virtually all of the time available to work on this project prior to December 21st was spent acquiring the project-related rulings, reports, and data, and importing that data into my redistricting software.
11. The Court's December 21st order setting a December 27th deadline for report submission provided only a brief window of time for work on this analysis and report. And work on this report had to be balanced with the ongoing obligations of the 18 current districting projects.¹
12. I was able to complete my analysis identifying the key concerns found in the Special Master's report and maps, but there was insufficient time available to re-run the data to correct the flawed tables from the Special Master's report or to develop redrawn maps to fix the areas of concern found.

D. CDPs are not Municipalities

13. One challenging issue in districting and redistricting work is the complex way that the Census Bureau labels and releases data. Of particular relevance to this case is how the Bureau compiles and releases data on municipal boundaries, given the Court's direction to the Special Master 2(f)(iii), "Consider municipal boundaries . . ."
14. Each decennial Census, the Bureau releases a geographic file called "Places" for each state. In this file are each form of official municipal governments for the state in question. For North Carolina, an official municipal local government could be a city, town, or village, and the Census Places file includes a field indicating to which category each of the state's 553 municipalities belongs.
15. A geographic file with the boundaries of the 553 municipalities was also posted to

¹ I am currently working on districting projects with the cities of Barstow, Lodi, Martinez, Menlo Park, Norco, Oxnard, Placentia, Twentynine Palms, and Ventura; with the school districts of El Monte Union High, Inglewood Unified, La Mesa Spring Valley, Lowell Joint Union, Poway Unified, Redwood City Schools, San Dieguito Union High, Westminster Elementary, Whittier City Schools; and with Tri-Cities Healthcare District.

the state's redistricting website and available for download by anyone interested.²

16. Where knowledge of the Census geography is important is realizing that the Census Places file also includes an additional category of "Census Designated Places," or CDPs. By definition, CDPs are not official local governments. The Bureau's official definition states "CDP is the abbreviation for Census designated place, the statistical counterpart of incorporated places and are delineated to provide data for settled concentrations of population that are identifiable by name but are not legally incorporated under the laws of the state in which they are located. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines." In short, CDPs are unincorporated areas that are not political subdivisions and that do not have their own local governments. Any redistricting mapping or report that wishes to consider "municipalities" and avoid (or at least acknowledge) splits of municipalities should either use the state-provided municipalities file or remove CDPs from the census-provided files (which is easy to do, given the labeling provided by the Census Bureau).
17. To better understand the difference between municipalities and Census Designated Places, it is useful to consider the difference between states and federal territories in the United States. While both may be included in a Census geographic file, obviously an analysis of state governments would only use the 50 states, not the 67 combined total of states, the District of Columbia, and federal territories. When analyzing municipalities in North Carolina, the analyst should only use the 553 municipalities, not the 739 "places."
18. The Special Master hints at awareness of this issue on page 10 of his report, when he states "Census Designated Places ("CDPs"), which usually refer to city boundaries." Yet he does not follow up on that "usually" reference and in that same sentence incorrectly equates "political subdivision boundaries" with Census Designated

² <https://www.ncleg.net/representation/Content/BaseData/BD2016.aspx> -- the file is in the "Geographic Data" section under "Administrative Areas (cities, townships, etc.)."

Places.

19. The Special Master then bewilderingly labels municipality splits in his tables E, F, G, H, I, J, and K as “Municipalities (CDPs).” To return to my earlier comparison, this is the equivalent of labeling a list “States (Territories),” which obviously indicates confusion over what analysis is being conducted.
20. While I do not have sufficient time available to re-run the tables using only municipalities, it is clear that the tables would show different results if only the 553 municipalities are analyzed instead of the combined 739 municipalities and Census Designated Places that the Special Master appears to have used in his analysis.
21. This also leaves unaddressed and unknown how much of a role these CDP borders played in the Special Master’s map-drawing. If he over-ruled a state legislative decision and redrew a district boundary because he felt it would better follow an unofficial CDP border, that decision would appear to fall outside of the Court’s order to the Special Master.

E. Blocking “Rippling” in Wake County Harms Traditional Redistricting Principles

22. A common redistricting situation is that changes “ripple” between districts. It is rare when the best way to achieve a desired change to unite a municipality, to improve compactness, or to achieve some other goal can be accomplished by a simple swap between two districts. Often the best way to achieve the overall goals of the map is to “ripple” the changes between multiple districts.³ Rather than forcing a non-compact or community-splitting swap between two districts, “rippling” uses additional districts to avoid additional community splits, create a more compact map, or otherwise achieve traditional redistricting goals better than a simple swap between adjoining districts allows.

³ For a longer discussion of this “ripple effect,” see Handley, Lisa and Bernard Grofman, editors, Redistricting in Comparative Perspective, Oxford University Press, 2008, p. 36.

23. In Wake County, the Court directed the Special Master to undo the Legislature's "ripple" changes in districts 36, 37, 40 and 41, even though they lie within the same county grouping as districts that the Court did direct the Special Master to redraw.
24. From a map-drawing perspective, both state constitutional and traditional redistricting principles could be better addressed if it is accepted that the equal population, compactness, respect for municipal boundaries, and other constitutional and traditional redistricting principles are more effectively addressed within the entire county grouping than if redrawing is limited to a contiguous sub-set of the county grouping.
25. The Special Master's own words agree with this opinion, as he wrote: "Significant redrawing must occur in some districts because of the 'leftover' territory that remains once the 2011 districts are reinstated (The task is similar to fitting several square pegs into a round hole – the pegs need to be reshaped if they are going to 'fit.') . . . Altering only the district necessary to remedy the identified state constitutional problems . . . while reinstalling the Enacted 2011 Districts, leaves limited options for reconfiguring the districts." (p. 57 and 58)
26. While the Special Master goes on to state that "This is a virtue, not a vice," the Special Master's own redistricting data show the detrimental effect of restricting the scope of redrawing: restoring those four districts (36, 37, 40 and 41) to their 2011 borders has a negative impact on the map's stated redistricting goals: (a) it increases the population deviation in the districts adjacent to districts 33 and 38 (Districts 11, 34, 35, 39 and 49) by a net 0.5%; (b) changes the Polsby-Popper compactness score of those five districts by a net -0.05 (negative scores indicate less compact districts); and (c) increases the number of VTDs split by those five districts by 7.⁴

⁴ The net Reock compactness score of the five districts in question increases by 0.7. And the number of municipalities divided decreases by one, because the 2017 map increased the number of municipality splits in District 49 by one to achieve its goal of decreasing the number of municipality splits in District 40 by four. The Special Master's

27. There is also the definition of adjacency to consider. While 2011 District 37 is not adjacent to Districts 33 or 38, District 33 as corrected in the 2017 Enacted Map is adjacent to 2011 District 37. Allowing the resulting “ripples” between Districts 36 and 37 thus seems logical and in agreement with the Court’s reasoning on the need for changes in the original adjoining districts to avoid, as the Special Master stated, “leftover territory” (and the decrease in compactness, increase in VTD splits, and otherwise over-riding legislative decision-making in districts that were not found to be in violation of any legal districting requirements).

F. Blocking “Rippling” in Mecklenburg County Harms Traditional Redistricting Principles

28. As in Wake County, the ban on “rippling” within the County grouping similarly has a negative impact on the constitutional and traditional redistricting goals in Districts 92, 103 and 104. In particular, District 104 increases from a -3.3% population deviation from the mean to a near-maximum -4.8%. And the Polsby-Popper compactness scores of these three districts decrease by a net .20, while Reock compactness scores decrease by a net .38. And the compactness of both restored 2011 District 105 and the adjusted Districts 92, 103 and 104 are all worse than in the 2017 adopted map. Finally, the number of split VTDs increases a net six VTDs in the adjusted 92, 103 and 104 (in addition to the six VTD splits added to the restored-to-2011-lines District 105).

29. In Arizona in 2001, where I served as lead technical consultant to the Arizona Independent Redistricting Commission (the nation’s first voter-created, independently-appointed, and independently-acting state-level redistricting commission), the Federal Court put in place an emergency map of state Legislative districts – endorsed by both parties and by a Court-appointed Special Master – that

Recommended Plan has one less municipality split in District 49 but restores the five splits in District 40.

avoided “rippling” primarily because at the point of the Court ruling the Secretary of State said there was not time to implement extensive changes before election day. Because of the lack of “rippling,” the resulting map was right at the maximum 10% overall population deviation target, and a number of odd-shaped changes were made and used in the 2002 state Legislative districts.⁵ Yet all parties, the Court and the Special Master all agreed that the map should be redrawn for 2004 to appropriately “ripple” the changes to better comply with the state and federal criteria. In North Carolina, the Special Master’s own data and words show that in Wake and Mecklenburg Counties the 2017 Legislative maps – with the “rippling” of the changes within the County grouping – better meet the state and traditional redistricting goals than the districts drawn by the Special Master.

G. Blocking “Rippling” Locks in Unconstitutional 2011 Considerations

30. A further consideration impacts any evaluation of whether to allow or block “rippling” changes in Wake and Mecklenburg counties: the potential continuation of what the Court has determined was unconstitutional consideration of race in the state’s 2011 maps. The record of this case has established how in 2011 the state first drew what it considered the districts most sensitive to challenges under Section 2 and/or Section 5 of the Voting Rights Act. The shape of those districts then dictated the options for redrawing all of the remaining districts within a given county grouping.

31. In Wake County, the drawing of 2011 House Districts 33 and 38 generally in the center of the county forced all of the other districts in the county to “ripple” around them: District 39 was largely ‘pinned’ in the east part of county, while what appear on the map to have been efforts to ensure that Districts 11, 40 and 49 each included significant portions of Raleigh within the confines of accommodating Districts 33

⁵ In Arizona, one set of 30 Legislative districts is used for State House and State Senate Districts. Each legislative district elects one State Senator and two State House members.

and 38 as drawn dictated the locations of outer portions of 40 and key portions of 11 and 49. Those limitations on Districts 11 and 39 – imposed by the drawing of Districts 33 and 38 now declared unconstitutional -- then ‘locked in’ Districts 36 and 37 (and, to a lesser degree, District 41) in the south end of the county and dictated their outer boundaries.

32. Within North Carolina’s strict ‘county grouping’ legal requirements, there are very few changes to one or two districts that would ever avoid impacting most or all of the other districts in the county grouping. It would be essentially impossible for the 2011 districting decisions regarding the shape and location of House Districts 33 and 38 to have not had a major impact on districting decisions for all the remaining districts in the county, even where those districts are not adjoining 33 or 38.

33. The same could be said for the districts in Mecklenburg County. It is nearly impossible that one district in the County (105) was constitutionally drawn when the Court’s finding of constitutional violations in three of the districts can only be remedied by the redrawing of the other eleven districts in the county. The shape and location of the first three districts drawn in the county would certainly have a significant impact on how all of the remaining districts in the county grouping are drawn, including the non-adjacent districts in that county grouping.

34. The logic of ruling that changes to Districts 36, 37, 40, 41 and 105 cannot be made while redrawing the other districts in the Wake and Mecklenburg county groupings would also seem applicable to all changes in every district adjoining unconstitutional 2011 Districts 33, 38, 99, 102 or 107 beyond the bare-minimum legally required changes. It would seem logical to extend the ban on redrawing of Districts 36, 37, 40, 41 and 105 to redrawing any changes in the districts bordering 33, 38, 99, 102 or 107 beyond the changes required to achieve the state and federal constitutional requirements for contiguity and population balance. The reasoning barring “rippling” changes within the county grouping would logically also bar any changes aimed at preserving VTD or municipality borders, improving the compactness of districts, or

achieving any of the other goals stated (or unstated) of the Special Master beyond contiguity and population balance.

35. Of course, the resulting districts would be very oddly shaped, include widespread division of municipalities and other communities of interest, and disregard the other stated (and any unstated) traditional redistricting goals of the Legislature or Special Master when redrawing the districts. As a policy issue this would be a significant detriment for the voters and residents of North Carolina. And so is, for the exact same reasons, the decision to bar any adjustments to the borders of House Districts 36, 37, 40, 41 and 105. Just as the interests of the voters, residents, and communities are served by allowing redrawing of all portions of the districts bordering 33, 38, 99, 102 or 107 when remedying the issues found with those districts, it also serves the interests of the voters, residents, and communities to allow redrawing the remaining districts in the same county grouping.
36. Perhaps most importantly, allowing this more extensive range of change provides the additional benefit of allowing the removal of the “ripples” from the original decisions in the drawing of 33, 38, 99, 102 and 107 that have since been declared unconstitutional. Preserving Districts 36, 37, 40, 41 and 105 preserves the impact of those original decisions that have now been declared unconstitutional.

H. Compactness is more than a Geometric Concept

37. The Special Master states that “Compactness is a traditional districting principle, an aesthetic value, and a geometric concept.” I agree that it is a traditional districting principle, but limiting its importance to an “aesthetic” or “geometric” factor misses the key reason it is important in redistricting, and limiting the measurement of compactness to two measures apparently because they are the easiest and fastest to perform on a computer seems to miss the importance of compactness to the voters (and thus to redistricting).
38. The Maptitude software from Caliper Corporation used by me, by the Special Master,

and by the overwhelming majority of redistricting technicians and redistricting demographers includes nine different (and often contradictory) measures of compactness, including the simple-to-calculate Reock and Polsby-Popper scores.⁶ Maptitude also includes the Population Polygon, which takes considerably longer to calculate but that arguably measures a much more important factor: how compact is the population of a district (compared to a simply measure of the geography of a district, as measured by Reock, Polsby-Popper and some other measures).

39. Ultimately the public policy importance of compactness is that it is easier for voters to organize and influence an election in a district where the voters are located in a compact area than it is to organize and influence an election if voters are extremely spread out. In any state with rural and urban areas, or with mountain ranges and other geographic barriers, compactness becomes a relative measure because some voters will not live near any other voters regardless of how geographically compact a district is drawn, and some geographically compact districts will not be easy to organize because there is a mountain or other major barrier in the way.

40. In California, the voters approved Proposition 11 creating that state's Independent Redistricting Commission and setting criteria for the drawing of districts by that Commission. The Proposition 11 criteria, now established as Article XXI, Section 2(d)(5), of the state Constitution,⁷ define compactness from a public policy perspective: "districts shall be drawn to encourage geographical compactness such that nearby areas of population are not bypassed for more distant population." This common-sense rule better captures the policy importance of compactness even better than the Population Polygon test in Maptitude, which itself measures the policy

⁶ <https://www.caliper.com/glossary/what-are-measures-of-compactness.htm>, accessed on December 25, 2017, lists and describes the compactness measures included in Maptitude for Redistricting.

⁷ http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=CONS&chapter=&article=XXI, accessed December 25, 2017

importance of compact districts better than the Reock or Polsby-Popper test.

41. Most importantly, the policy-oriented approach of the California Independent Redistricting Commission criterion avoids encouraging the artificial claim to near-perfect compactness of districts such as the Special Master's nearly circular District 28 in Guilford County. As the Special Master points out on pages 25 through 27 of his report, people in North Carolina do not live in circular communities, and (referring to the Reock and Polsby-Popper measures), "These particular measures served as significant constraints in formulating the Recommended Plan."

I. Apparent Predominant Use of Race Data

42. The Court stated that "The Special Master may consider data identifying the race of individuals or voters to the extent necessary to ensure that his plan cures the unconstitutional racial gerrymanders and otherwise complies with federal law." The Special Master, in his report, does not cite any situation where he used racial data for that purpose. Yet he acknowledges having the data active in his redistricting system as he drew the lines and reports the racial and ethnic percentages of the districts in the Special Masters' plans.
43. Anytime racial and ethnic data are used in districting or redistricting, the map-drawer must be cautious to avoid violating the federal bar on using race as the predominant factor. The Special Master acknowledges this requirement, with the following claim: "[A] remedial plan grounded on these traditional districting principles . . . is inoculated against the kind of attack that the Legislative Defendants seek to lodge with respect to racial predominance." (p. 20)
44. The Special Master's position appears to be that the plan cannot unconstitutionally have race as a predominant factor simply because he says that is the case. The Special Master states that his decisions are based on traditional redistricting principles excluding race. But if that claim were entirely true there is no reason to

have race and ethnic data in the redistricting system at all, and the Special Master acknowledges not only that race is in the system he used, but that, other than total population counts, race data is the only data in his system.

45. Each time there are problems in the data cited as the predominant factors in why district lines are drawn where they are drawn, it raises the question of whether race is quietly but predominantly influencing those lines. In light of the flaws discussed above in the compactness measures, together with the “municipalities” boundaries used by the Special Master, and the remarkable similarity in the African-American percentages of the Voting Age Population in the districts drawn by the Special Master, it is natural to ask whether those problems and results are truly coincidental, or if they indicate the use of race as a predominant factor.
46. The Special Master disputes the Legislative Defendants’ claim that the Special Master had as a goal or quota “some arbitrary racial target,” stating “certain districts . . . fall outside the supposed race-based range that the Defendants allege was motivating the Special Master in the construction of the remedial districts.”⁸ But the district then cited by the Special Master, House District 38, was **not** a remedial district. In fact, the Legislature’s 2017 adopted House District 38 was a district that the Court specifically cited as having fully addressed the Court’s concerns, and the Special Master kept the district exactly as drawn by the Legislature.
47. More relevant to a determination of whether the Special Master aimed to hit a “racial target” would of course be the districts that the Court said were drawn by the Legislature with improper consideration for race: Senate Districts 21 and 28, and House Districts 21 and 57. The African-American percent of the Voting Age population in those four redrawn districts was 42, 44, 39 and 38, respectively, and those figures are remarkably consistent for districts allegedly drawn without any racial percentages in mind.

⁸ Special Master’s report, p. 22.

48. Also noteworthy from a demographic and political perspective is that the Special Master's changes reduce the Black percentage of registered Democrats in all of the districts in question, dropping from 42 percent to 39 percent, from 45 percent to 38 percent, from 40 percent to 36 percent, and from 54 percent to 33 percent, respectively.⁹

49. Redrawn House District 61 in Greensboro, which adjoins the Court-identified House District 57, is also redrawn by the Special Master to fall precisely in this same racial percentage range, at 40 percent Black share of Voting Age Population and 34 percent Black share of Democratic registered voters.

J. Use of Race Data in redrawing Greensboro House Districts

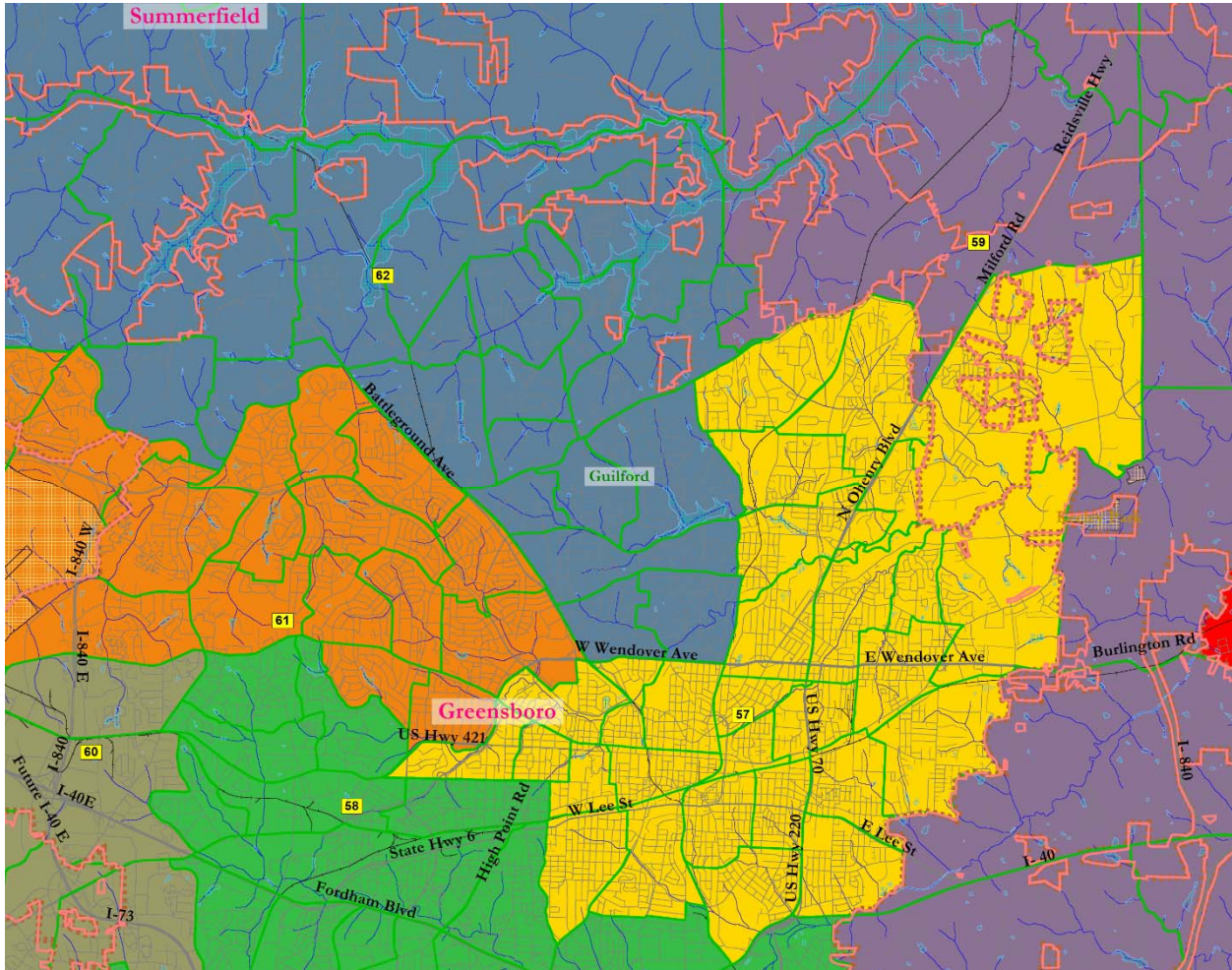
50. In particular, the Special Master's decisions regarding House Districts 57, 61 and 62 in Greensboro raise questions regarding whether certain racial quotas were targeted by the Special Master when drawing the districts.

51. As shown in Map 1 below, the Legislature drew House District 57 in the area of in the eastern part of the city and almost entirely in the city, House District 61 combining western Greensboro with the suburbs west and southwest of the city, and House District 62 combining the northwestern suburbs with the central and northwestern portions of the City. As drawn by the Legislature, 97 percent of House District 57's population lives in the City of Greensboro, compared to 64 percent of the population of House District 62 and only 45 percent of the population of House District 61. House District 58 is also drawn by the Legislature with 93 percent of its

⁹ The African-American percentage of registered Democratic voters is traditionally a key data point in the determination of whether an African-American candidate will win the Democratic primary, and thus whether African-American candidate will be the nearly certain general election winner in these districts. Since all four districts in question have more than a two-to-one Democratic-to-Republican registration advantage in both the Legislature's version and in the Special Master's version, the winner of the Democratic primary is the near-certain winner of the general election.

population in Greensboro. The result is two essentially all-Greensboro districts and two districts that combine significant Greensboro population area with residents in the western suburbs.

Map 1



52. The Special Master completely redrew House Districts 57, 61 and 62, leaving only the extreme western portions of Greensboro in District 62; rotating District 57 from a north-south orientation in the eastern part of the City to a horizontal orientation in the north, and redrawing District 61 to stretch horizontally across the center of the City (as shown in Map 2 below). The Special Master's decisions essentially ended the shared representation of the suburbs and the city, as the Special Master packed

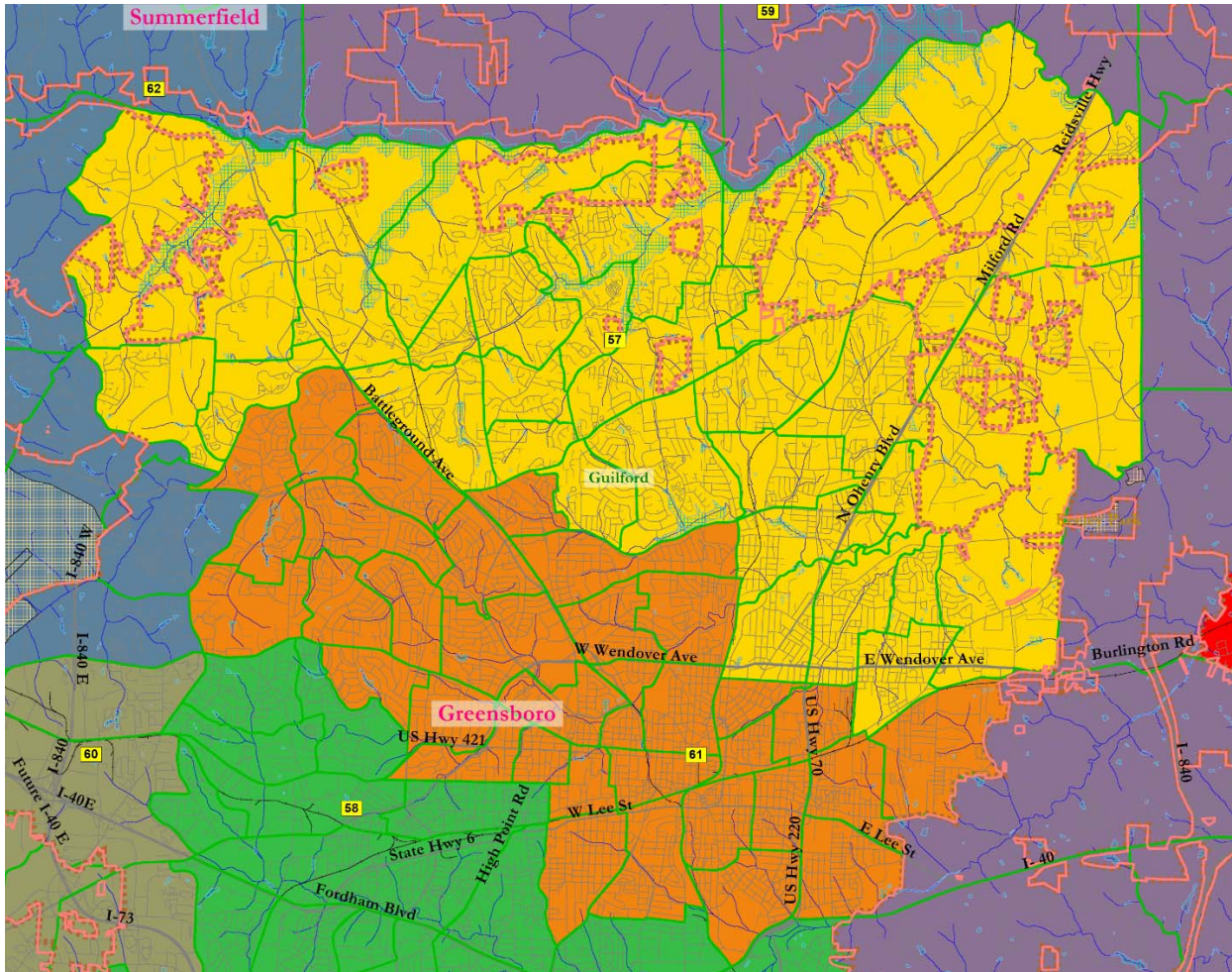
essentially all of the western and southwestern suburbs into a long, stretched-out House District 62. District 61, which in the Enacted 2017 House map was a majority-suburban district, is redrawn by the Special Master to be 100 percent within the City of Greensboro, leaving three essentially all-Greensboro districts and one essentially all-suburban district:

Table 1

2017 Map	Total	Greensboro	Suburban	Pct Greensboro
57	82,755	80,164	2,591	97%
58	82,137	76,171	5,966	93%
61	81,019	36,131	44,888	45%
62	80,732	51,747	28,985	64%

Rec Map	Total	Greensboro	Suburban	Pct Greensboro
57	83,303	75,941	7,362	91%
58	82,137	76,171	5,966	93%
61	79,754	79,754	0	100%
62	82,137	5,966	76,171	7%

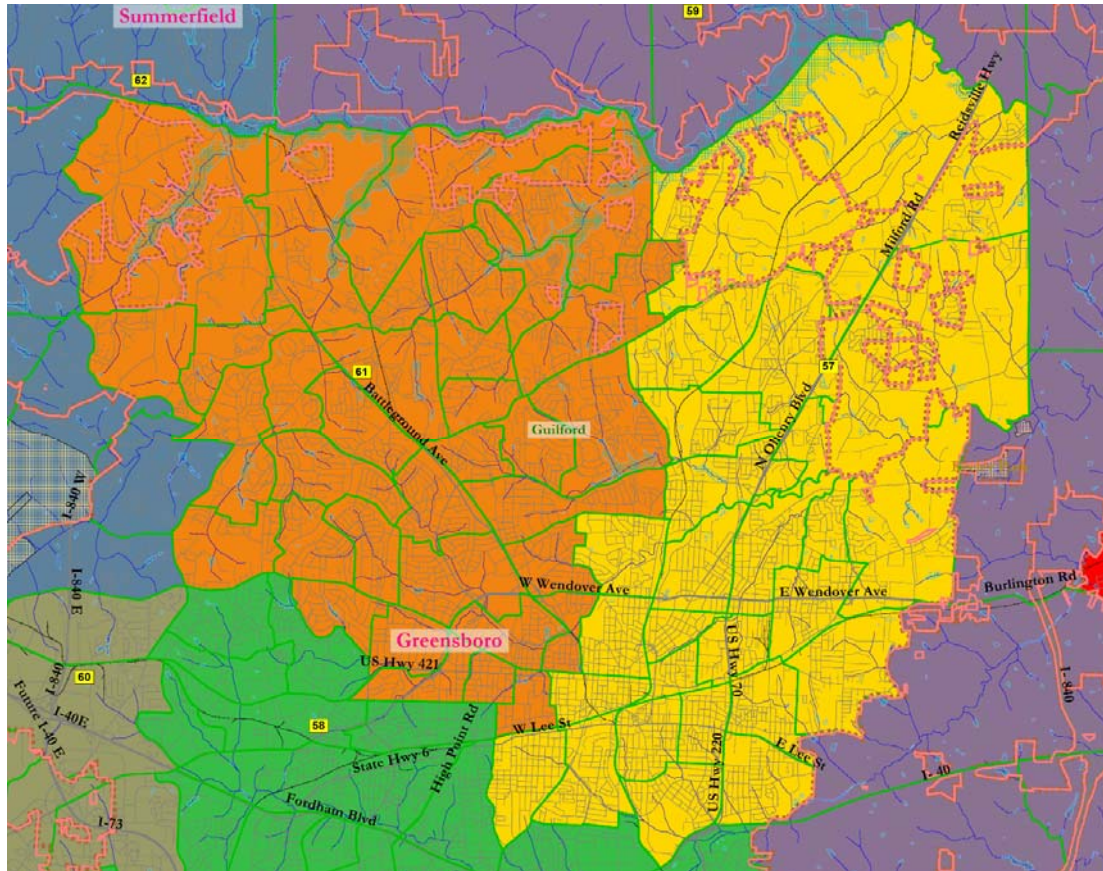
Map 2



53. House District 58, as enacted in 2017 and preserved by the Special Master, is already in the Black percentage of Voting Age Population range of the Special Master's redrawn districts, at 43 percent.
54. The Special Master's new Districts 57 and 61 teetered on the brink of population imbalance (District 57 is 4.84% from the target population). But they achieved the racial quotas that Legislative Defendants allege was the Special Master's quota: Blacks are 38 percent (in District 57) and 40 percent (in District 61) of Voting Age Population, and Blacks are 33 percent (District 57) and 34 percent (District 61) of Registered Democratic voters.
55. Yet two compact House Districts with much closer population balances and better compactness scores could have been drawn in the exact same area as the Special

Master's Recommended House Districts 57 and 61 (and thus the exact same respect for Municipal and VTD boundaries), as shown in Map 3 below:

Map 3



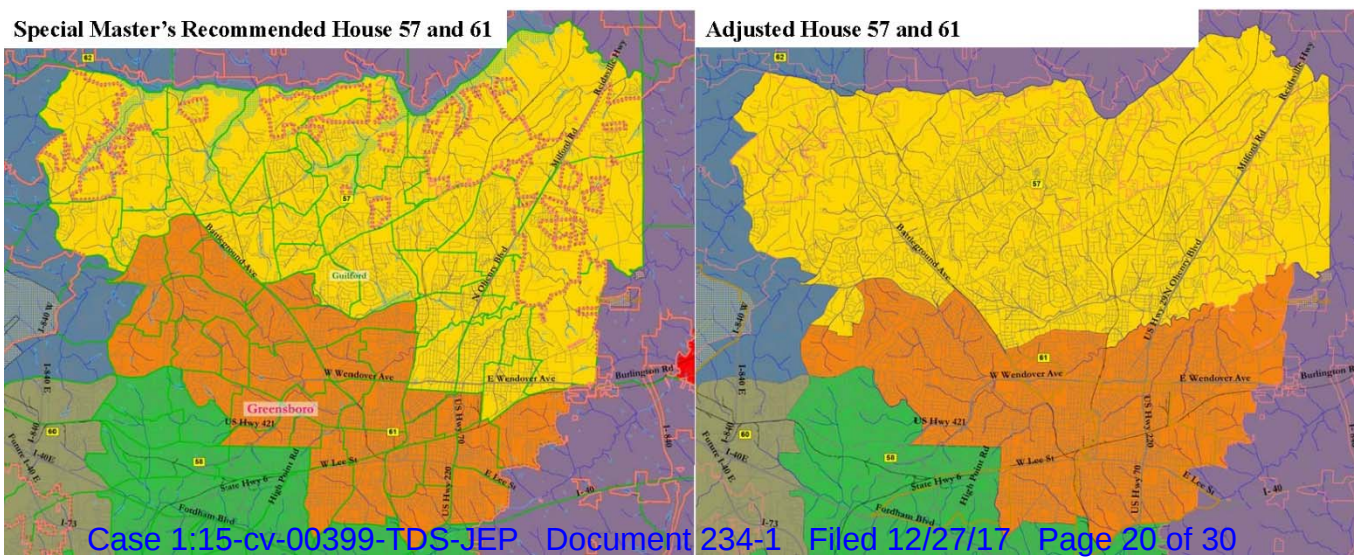
56. The population deviations of these sample districts are 2.88 percent and 2.32 percent, avoiding the 4.84 extreme of Special Master's proposed House District 57. The combined Polsby-Popper and Reock scores are also significantly better: a combined .97 Reock score compared to .81 for the Special Master's districts, and a combined .74 Polsby-Popper score compared to .65 for the Special Master's districts.
57. I also looked at the Population Polygon compactness scores¹⁰ and both of these districts outscore the Special Master's proposed districts, 0.83 to 0.81 for District 57 and 0.83 to 0.73 for District 61.

¹⁰ The population polygon measure analyzes the compactness of the population in a given district, rather than the territory: <https://www.caliper.com/glossary/what-are-measures-of-compactness.htm>, accessed December 27, 2017.

58. While it improves the compactness scores and the population balance of the two districts, this sample configuration does not provide two Districts in the 38 to 44 percent Black percentage of Voting Age Population that Legislative Defendants allege is the racial quota of the Special Master.¹¹ Given no alternative explanation for the horizontal rotation of District 57 and 61; given equal treatment of municipal and VTD integrity; and given the resulting negative impacts on the Special Master's claimed other predominant factors (population balance and compactness), it is logical to believe that race played an excessive role in the determination of how the Special Master configured House Districts 57 and 61 (and, by logical extension, to be concerned that the Special Master gave excessive consideration to race when drawing the other revised House and Senate Districts).

59. Reinforcing this concern that a racial quota dictated the configuration of the Recommended House Districts in Greensboro is the odd point at which the Special Master stopped rotating District 57 and 61 from a vertical to a semi-horizontal axis. As seen in the image below, with the Special Master's map on the left and an adjusted map on the right, the Special Master stopped rotating the districts with a northwest to southeast tilt to the border between House District 57 and 61. The adjusted map shows that a more logical east-west border was possible, and indeed the adjusted map has a significantly more population balanced map (the population deviation of the Special Master's House District 57 is a near-maximum 4.84 percent, compared to 2.96 percent in the adjusted map):

Map 4



60. Other than the more clear and logical borders of the adjusted map, the key difference between these two configurations is the Black percentage of Voting Age Population: in the Special Master's Recommended Map both House Districts 57 and 61 are almost perfectly balanced in the alleged Black percentage of VAP racial quota at 38 and 40 percent, while the same districts in the adjusted map are 28 and 48 percent Black VAP respectively. Given that the Special Master's districts are not population balanced with each other; that the compactness measures are essentially identical; that the horizontal border is more logical and easier for voters to understand; that both versions avoid splitting VTDs; and that the outer borders are identical, none of the Special Masters' stated explanations support why the borders of these districts were drawn as recommended. But the difference in the Black percentage of the Voting Age Populations in the districts offers a clear, if concerning, explanation.

K. Racial Quotas Appear to Predominant in Circular Greensboro Senate District 28

61. Though the Special Master earlier noted that "circles cannot tessellate to serve as building blocks for larger shapes,"¹² in Greensboro the Special Master appears to have put the exercise of trying to draw a near-perfect-circle Senate District above all other considerations without explanation.
62. The Special Master's recommended Senate District 28 removes the incumbent from the district; increases the population deviation of all three Senate Districts involved 24, 27, and 28¹³; and does not include the entirety of municipal Greensboro.
63. Two VTDs and a handful of zero-population Census Blocks in the southeast portion of the City (see map below) are moved from 2017 Enacted Senate District 28 into the Special Master's Recommended Districts 24 and 27 apparently to make the

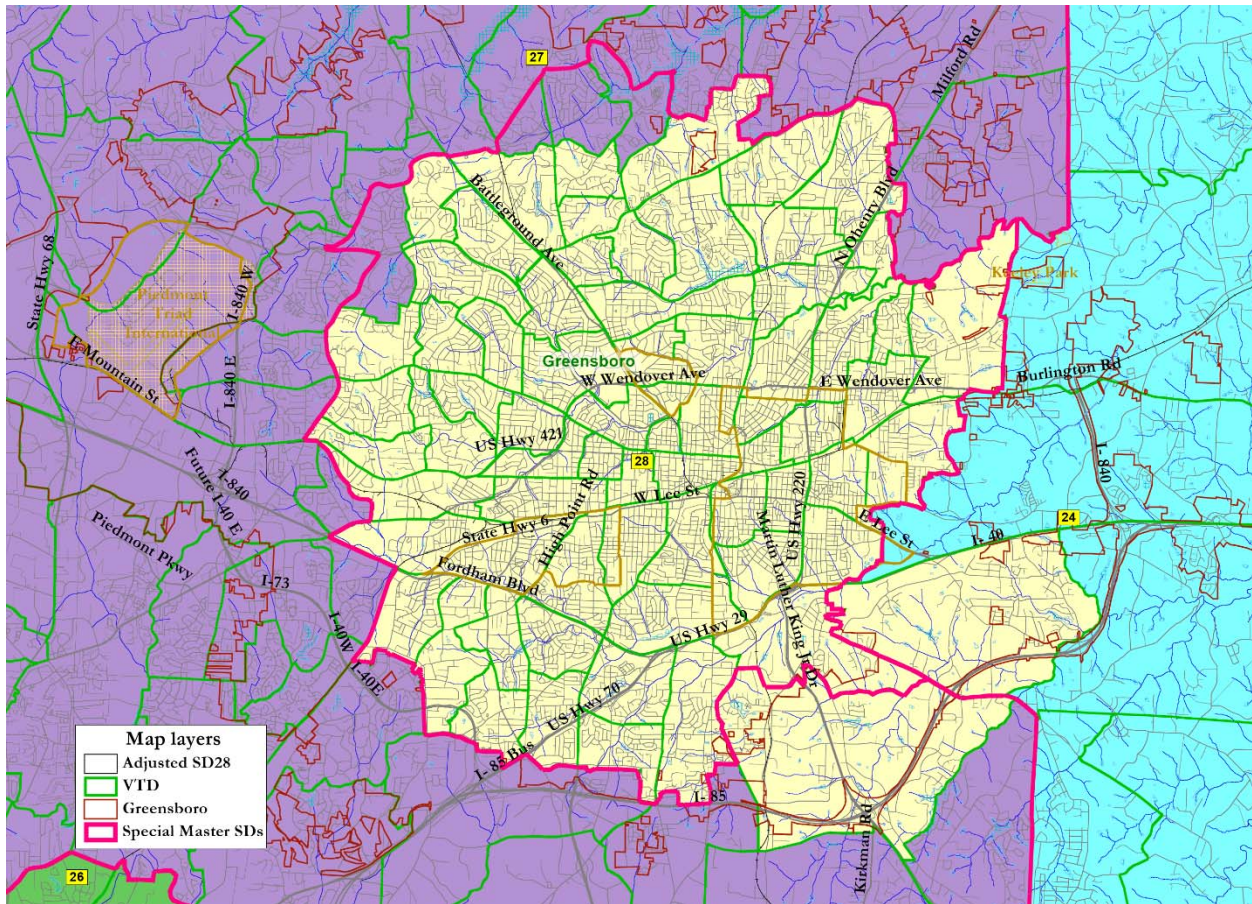
¹² P. 25

¹³ District 24 increases from -0.39% to 2.44%; District 27 increases from 1.03% to 3.36%; and District 28 increases from 3.37% to 3.89%.

Recommended District 28 look more round – even though moving the one VTD tripled the population deviation of Senate District 24 from 1.03 percent to 3.36 percent.

64. Leaving the VTD in question in Senate District 28 would have had essentially no impact on the Black percentage of Voting Age Population (43% with that VTD included in District 28, versus 44% in District 28 in the Recommended map), nor would leaving that VTD in District 28 have impacted the Black percentage of Registered Democrats (38% in District 28 with or without the VTD).
65. The VTD in question, number 37081JEF3, does contain some non-Municipal residents, but so does adjoining VTD 37081G75, which the Special Master left in Recommended district 28.
66. Reuniting those southeastern VTDs in Senate District 28, and offsetting the added population by restoring to District 27 a couple of northeastern VTDs moved by the Special Master from District 27 to 28, restores the population balance of Senate Districts 24, 27, and 28; has no substantive impact on the compactness of Senate District 28 (the Reock score changes from .70 in the Recommended plan to .68 in the adjusted district shown below, and the Polsby-Popper score changes from 0.28 in the Recommended plan to 0.27 in the adjusted district). And the population balance of all three districts improves over the percentages in the Recommended plan: to 1.03% in District 24 (from 3.36% in the Recommended plan); 2.34% in District 27 (from 2.44%); and 3.39% in District 28 (from 3.89%).

Map 5



67. In this adjustment there is a small change in the Black percentage of Voting Age Population and the Black percentage of Registered voters: the Black percentage of Voting Age Population changes from 44% in the Recommended plan to 46% in the adjusted district; and the Black percentage of Registered Democratic voters increases from 39% in the Recommended plan to 40% in the adjusted district. This change does take District 28 out of the 38 to 44 Black percent of Voting Age Population range that the Legislative Defendants allege the Special Master improperly aimed to place his redrawn districts (Blacks are 44 percent of VAP in the Special Master's recommended Senate District 28). If we take the Special Master at his word that he denies aiming to hit any "arbitrary racial target," then the only remaining explanation

is that VTDs were moved and the population deviation of districts were significantly increased in the pursuit of a highly unusual nearly-round district and for a mere 0.01 increase in compactness scores.

68. In my experience, the only time a map-maker would make such a tradeoff would be to have a unique district map to hang on a wall (in this case, due to its near-unique circular character). But in the Special Master's admission that the "peculiarity" of the Reock and Polsby-Popper compactness measures influences his drawing of the House Districts in this area, he notably does not cite that as motivating the Senate District here. This creates a legitimate concern that the district as drawn achieves some unstated racial quota, since none of the stated goals fully explain why some areas were included and others excluded.

69. Of course, even this adjusted map fails in what the Court and the Special Master acknowledge as a noteworthy state criterion: the avoidance of pairing elected officials and an effort to keep legislators with at least the core of their existing districts. I discuss the importance of this redistricting goal in more detail below, but here it is worth noting that when the Special Master draws his "Senate Alternative 2" map to address this redistricting goal the Reock and Polsby-Popper compactness improvements made in his Recommended District 28 (relative to the Enacted 2017 map) are almost entirely lost¹⁴. In Alternative 2, the number of municipality splits now equals the number of municipality splits in the Enacted 2017 map. And the population deviation of District 28 in Alternative 2 hits a near-maximum 4.91 percent – significantly higher than the 3.37 percent in the Enacted 2017 map. The remarkable similarities in these numbers highlights how keeping an incumbent and the district's core explain most of the differences between the Enacted 2017 version of Senate District 28 and the Recommended Map Senate District 28.

70. As it is in the Enacted 2017 district, the Special Master's Alternative 2 Senate

¹⁴ District 28's compactness scores in the Enacted 2017 map are .42/.17 (Reock/Polsby-Popper); in the Alternative 2 map are .44/.20; and in the Recommended Map are .70/.28.

District 28 is a Greensboro-dominated district that also includes small parts of the municipality of Jamestown for the direct purpose of keeping two legislators with the core of their districts.

71. The only significant difference between Alternative 2 District 28 and the Enacted 2017 District 28 not explained by these data is the Special Master's trade-off of northeast Greensboro population for central/northwestern Greensboro population, which generates three results: the tiny 0.02 Reock and 0.03 Polsby-Popper score improvements; the near-maximum 4.91 percent population deviation in Alternative 2's Senate District 28; and, at 44 percent, the changes bring Senate District 28 into the Special Master's remarkably consistent Black percent of Voting Age Population range for his adjusted districts.

L. Use of Non-Voting Population

72. In North Carolina, using the state's 2010 Census and 2010 Registration data, 36 percent of the total population is not registered to vote. In a sub-set including only the eight counties where the Special Master redrew district lines, a similar 35 percent of the total population is not registered to vote.

73. In many areas, the percentage of unregistered voters is relatively constant. But in a few areas there are significant concentrations.¹⁵ And those concentrations result in a considerable increase in the political power of the remaining voters in their legislative district.¹⁶

¹⁵ This can occur because an area has a relatively high concentration of non-citizens; a relatively high concentration of families with children under 18; a college or military base (where residents are generally registered to vote in their home towns); a prison (where some or all residents may have, at least temporarily, lost their right to vote); or for similar reasons.

¹⁶ Because districts are drawn based on total population, not registered or eligible voters, a block of voters have more voting influence if they are drawn into a district with many non-registered voters than if they are drawn in a district with a high ratio of voters to total population. As a hypothetical example, if the ideal population of a district is 100,000,

74. In North Carolina 2017 Enacted Plan, the Legislature placed Fort Bragg and Pope Air Force Base in Senate District 19. This gave Senate District 19 the 5th-highest concentration of non-voting population among State Senate Districts, at 45 percent. Because this high concentration of non-voters was not placed in State Senate District 21, only 39 percent of total population in that District was not registered to vote – relatively close to the statewide average of 35 percent.
75. The Special Master states that his redrawing of Senate District 21 “begins by uniting split precincts”¹⁷ But of the 31,242 residents of the split VTD 37051G11 in question, **zero** were located in Senate District 21 in the 2017 enacted map. Barring some other motivation, the obvious way to unite the VTD would have been to put the zero-population area into District 19, rather than moving the entire VTD’s population from District 19 into District 21.
76. The result of the Special Master’s change here is that non-registered percentage of Senate District 21 jumps from 39 percent to 45 percent, while District 19 flips from 45 percent to 37 percent.
77. The Special Master only cites compactness as the reason for this significant reversal of the legislative decision as to which district the Fort Bragg and Pope Air Force Base should be assigned.

M. Keeping Incumbents with their Districts has Significant Policy Justifications

78. Analyzing whether a map avoids pairing two incumbents in one district is a simple task, as the Special Master discusses in his report. The most commonly

30,000 registered voters can easily control the election results in the district if there are only 20,000 other registered voters and the remaining population of the district are 50,000 college students, active duty military members, children under 18, etc. In contrast, 30,000 registered voters have far from a controlling influence on a district where, for example, there are large concentrations of ‘active senior living communities’ (such as the Sun Cities west of Phoenix in Arizona) and, as a result, of the district’s 100,000 population, 85,000 or more are registered voters.

¹⁷ P. 31

acknowledged reason is the obvious reason: the forcing from office of a legislator elected by the people. But there is more to the issue than that simplified summary.

79. Placing two incumbents together in one district removes from the voters their power to determine which incumbents deserve re-election. Even if the voters would otherwise vote to re-elect both legislators in question, the demographer's pen is denying the voters that opportunity. While post-redistricting some of the voters making the re-election decision may be different than the voters that previously elected the legislator, a map that avoids pairings of officeholders at least leaves the re-election decisions up to the voters.
80. But the issue of pairing incumbents is more complicated than that. When the Supreme Court acknowledged in its 1983 *Karcher v. Dagget* ruling the policy concern of "preserving the cores of prior districts," the Court was indirectly acknowledging that it is important from a good public policy perspective to not only avoid pairing incumbents, but to also avoid removing incumbents from the core of their districts.
81. Elected officials (and their staff) develop a familiarity with, and expertise in, the communities and issues in their districts. Whether the issues relate to specific programs, problems, needs or goals, each community has its own concerns. And many of those issues can be extremely complex in their history, conflicts, and/or legal frameworks.
82. In my own experience redrawing City Council districts in the City of Pasadena (California), a Council district was over-populated, and it contained a non-compact northern extension that, at first glance, appeared simple and easy to remove. Yet the community in that area came out in significant numbers asking to be kept in the district with their current Councilmember, despite the resulting lack of compactness. It turns out that the Councilmember had been working for years to end the liquor license of a local store that was a center of vandalism and crime in the area. Under local laws and regulations, there was a multi-year process of documentation of

problems and legal steps required to pull a license to sell liquor from an existing business. The local community greatly feared losing the experience and expertise that their current Councilmember had built up over the years of successful progress on this particular issue.

83. Every community has its own versions of the Pasadena community's liquor license battle, and no expert witness or Special Master from California can expect to learn all of these concerns in just a week or in just a month of redistricting work. So it is a useful rule of thumb that, whenever possible within the federal and state legal requirements, avoiding the pairing of current officeholders, and, almost as important, keeping each officeholder together with as much of his or her existing district should be a high priority.

84. The Special Master gives this issue particular attention in his discussion of Greensboro's Senate District 28. The Special Master acknowledges that Senate Alternative Map 1 would avoid pairing Senators Wade and Robinson, but would remove each from the core of their current districts. The Special Master then shows how Senate Alternative Map 2 would keep each of those two Senators with the core of their current districts, but the Special Master opposes the adoption of this alternative because "it does decrease the compactness of District 28, and causes District 28 to traverse into High Point."

85. That such a small change in the overall makeup of a district changes the Reock compactness score from 0.70 in the Recommended map to 0.44 in the Alternative 2 map highlights the fickleness and what the Special Master calls the "peculiarity" of the Reock measure, especially when the change in the Polsby-Popper measure is a much smaller change from 0.28 to 0.20.

86. The Alternative 2 map's District 28 includes only 3,160 residents from High Point – just 3 percent of High Point's over 104,000 residents, and just one VTD.

87. Perhaps the ultimate example of a local redistricting decision is whether a small decrease in a mathematical compactness formula's result and/or the removal of one

VTD from the district with the rest of a municipality's population is sufficient reason to remove two incumbents from the core of their districts. The trade-off between losing knowledge and experience with the local communities and their particular issues versus uniting that one VTD and having a somewhat more compact district is a classic example of a decision that is best made based by the residents in a given area and their elected representatives. Outside experts working for only a couple of weeks or less, no matter how extensive the expertise in redistricting, demographics and software those outside experts possess, could not spend the time needed to assess where such local decisions should be overturned, outside of those situations where federal or state constitutions or statutes require doing so.

88. The Special Master ignored this important traditional redistricting principle when he decided to favor his almost-perfectly-round Recommended District 28 over the Alternative 2 District 28 (pairing and separating legislators from the core of their districts).
89. In recommending the pairing of Senators Wade and Robinson in District 27, the Special Master is simply prioritizing compactness and avoidance of one slight municipal split above the importance to the communities and voters of the years of experience they have had working on their local issues with Senators Wade and Robinson in their respective districts.
90. While I lack the time to do a wider analysis of pairing and removing legislators from the core of their districts in the Special Master's recommended House and Senate maps, my impression from reading the Special Master's report is that he largely dismissed this traditional redistricting principle – and the policy impact that drives it – as unimportant and far less important than his stated focus on the Reock and Polsby-Popper compactness scores and avoiding divisions of VTDs and CDPs.
91. Unfortunately, there is not enough time available to specifically analyze the Special Master's redrawn districts in Wayne and Sampson counties. But typical map-drawing practice would be to follow the same goals, criteria and process in each part of the

map, so there is every reason to believe the redrawn Wayne and Sampson districts contain similar flaws as found in the redrawn districts covered in this report. From a quick look at the demographic summaries of the Recommended and Enacted 2017 maps, the demographics of the redrawn House Districts 21 and 22 follow a similar pattern to the other changes made by the Special Master. House District 21 is reduced from a Black percent of Voting Age Population of 42 percent in the Enacted 2017 map to 39 percent in the Special Master's Recommended Map (both values are in the alleged quota range). And in House District 22 the Black percent of Voting Age Population is increased from 28 percent in the Enacted 2017 map to 31 percent in the Special Master's Recommended Map.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed this 27th day of December, 2017.

A handwritten signature in black ink, appearing to read 'Douglas Johnson', is written over a horizontal line.

Douglas Johnson